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A REPORT has lately been submitted to the French Assembly, from one of the sub-commissions of the general committee of forty-five members, appointed in 1872, on motion of the Duc d'Audiffret-Pasquier, to inquire into the condition of the working classes of France. It contains much information on the relations between the employers and the employed in France. It sets the whole number of both classes at about eight millions, which is something like twenty-two per cent of the population. Of this number nearly eight hundred thousand are employers; and the total of twenty-three or twenty-four hundred thousand workmen gives about three to each employer, as an average, though in Paris itself the average is as high as twelve. Some points of difference between the French and English workmen are instructive. The laws of France have till lately practically forbidden trades-unions either among employers or workmen. Both were allowed to form associations, it is true; but till 1868 neither could appoint chairmen or secretaries, or keep any record of their proceedings. These restrictions were in themselves the less vexatious, perhaps, since the associations were allowed neither to hold debates, nor pass resolutions, nor make regulations for the promotion of any "pretended common interests," as the legal phrase was. Since 1868 both classes have been allowed to form themselves into local associations which they call "syndicates," with this difference, that the employers are permitted to unite their syndicates under the control of a central committee, and to publish a journal or organ, while the workmen can do neither. There are said to be about one hundred employers' syndicates in Paris, and sixty or eighty of workmen. The workmen, on the whole, naturally desire an extension of their privilege of combination, but the feeling of the country is against allowing it; and the reason is assigned, that the influence of trades-unions tends to take away the workman's freedom and responsibility as a citizen, and reduce him to a condition of serfdom. This is doubtless true; but it is likely that behind it lurks an unexpressed dread of socialistic tendencies. It is added in the report, that the more intelligent workmen do not wish for trades-unions.

The average wages in Paris are five or six francs a day; but, allowing for loss of time, this gives not more than about fifteen hundred francs a year; and the value of this sum is diminished by the fact that the workmen who used to live in the interior of the city, and within easy reach of their work, are now driven to the suburbs, and not only have to go and come, but must get their noon meal at restaurants. This, of course, leads to waste; and drunkenness, though rare in the south, is increasing greatly in all the northern half of France. The constant influx of the peasantry to the larger towns is a continual trouble, as, indeed, it is becoming all over Europe. The local authorities, whose testimony the commission has carefully collected, attribute this in a great measure to the fact that in the public schools there is no instruction given which tends in any way to the encouragement of interest in agricultural pursuits, so that the children receive the impression that agriculture is unworthy of their attention. In one neighborhood, where the experiment had been tried of making the instruction bear directly on agriculture, the immigration into the towns is said to have sensibly diminished.

THE Colonne Vendôme has been restored; and now it has been determined to put another statue of Napoleon on the top of it. It is a noteworthy sign of the growth of national spirit among the French, that while the governing body has declared itself most distinctly against the imperial party, and while yet the apprehensions of the influence of that party have by no means subsided, the figure of the great Emperor should be allowed again in its conspicuous position. This will be the fourth statue of him which has been set there. The original one, which he put up himself, was melted down immediately after the restoration, and recast into the statue of Henri Quatre which now stands on the Pont Neuf. Louis Philippe, in 1831, replaced it by another of different design. This, in its turn, was taken down in 1863, to make room for a third, which, like the first, represented Napoleon in his coronation robes. Our readers will remember the recent decree by which the painter Courbet, who instigated and supervised the pulling down of the column under the Commune, was ordered to pay the expenses of restoring it. We do not learn to what this has amounted in practice. The bas-reliefs of the former pedestal are said to have been but little injured; those of the shaft have been in great part recast. The column is not one of the most successful in Paris, but has considerable grandeur of effect, and its absence was a serious loss to the neighborhood of the Place Vendôme.

A COMMITTEE consisting of Mr. Wallon, minister of public instruction in France, M. Rendu de Rouay, president of the congress of Orientalists, M. Littré, and many other members of the French Institute, has sent a circular to all the governments, and all the learned societies of Europe, inviting their aid in an international archæological congress and exhibition, which it is proposed to hold in Paris in May of this year. The following questions have been proposed for discussion: the dolmens; primitive stone implements found in caves; the funeral customs of the Bronze Age; the Age of Bronze in the neighborhood of the Baltic; and the beginning of the Iron Age in Northern Europe.

MR. W. BURGES, R.I.B.A., the most rigid mediævalist, perhaps, among the English architects, has lately delivered before the English Architectural Association a discourse "On Things in General" — that is to say, architectural things in general — which attracted some notice, first as a *quasi* parental admonition from a member of the Institute to the younger, and, in a sense, rival association; and second because Mr. Burges holds among architects a position of somewhat Druidical isolation. Apart from certain criticisms on the present condition and tendencies of English architecture, his address was a plea for culture and study. It was noticeable, and perhaps not expected in a pronounced mediævalist, that he strongly urged the study of the figure, and of Greek art, as absolutely essential to acquiring the power of design. Since the neglect of the study of the orders among English and Americans, some other formal discipline, which should train the sense of proportion, has become very necessary. The art of profiling, for instance, is gone very much to decay, among us, at least; and the feeling for the right association of forms is greatly in need of regeneration. Nothing disciplines the sense in this respect like the study of the figure; and perhaps after this the most

helpful thing is the study of Greek moulding and ornaments, and even better, it may be, Greek vases. Ill-considered ornaments, crude mouldings, badly adjusted capitals and bases, basements, strings, and cornices out of relation to each other, are among the besetting faults of our architecture. There is no safer cure for them, or for any lack of perception of the relations of line to line, and form to form, than what Mr. Burges recommends, — the study of the figure and of Greek art. He says, "A knowledge of Greek art will be his [the student's] sheet-anchor during his artistic life. He will be saved many an error in composition, if he only asks himself, 'What would a Greek have said to this?'" There is material for an interesting essay on the affinities of Greek and thirteenth-century art, wide asunder as they seem.

BY order of the city government of Boston, a commission was appointed last spring to consider the existing condition of the sewerage of the city, and to report a plan for improving it. The commission have just presented their report, which discusses the whole question thoroughly, and recommends the establishment of an entirely new system of sewerage. They propose the building of two main sewers, which shall start from opposite points on the banks of Charles River near Cottage Farm Station, and, encircling the city on the land side, discharge into two reservoirs at a low level; the northern one on Breed's Island opposite Chelsea, the southern on the shore of Dorchester Bay. From these reservoirs the sewage is to be pumped into outfall-sewers which are to be extended out to near the harbor entrances on each side, so as to reach a rapid tide-way, when, delivered on the ebb, it will be carried at once out of danger of return. Branch sewers are planned to deliver the sewage of the various quarters of the town as directly as possible into the mains. The estimates of cost of the various main sewers, branches, reservoirs, pumping-engines, and outfall-sewers are, for the northern section about two and three-quarters millions of dollars, and for the southern section, which would drain the whole of the old city, about three and three-quarters millions.

Whatever improvements of detail it may be found practicable to make in the proposals of the commission, the main positions that they establish are incontestable, — the disorderly, unserviceable, and dangerous condition of the sewerage of Boston; the consequent injury to the health of the population; the necessity, in order to remove the sewage fast enough, of discharging it first at levels considerably below low-water mark, and then of lifting it into sewers which shall empty well out at sea, where there is tide enough to carry it away. An adequate provision for disinfecting the sewage, and then distributing it to be used as a fertilizer, is the only alternative for the outfall-sewers; and this it does not seem practicable to establish. It is to be hoped that no dread of the necessary cost, formidable as that looks, will be allowed to impede the carrying out of a thorough system. Efficient sewerage is expensive; but, next to war and conflagration, sickness is the most costly infliction to which a community can be subjected.

ECLECTICISM IN ARCHITECTURE.

HOWEVER little or however much we may approve of the eclectic design, it is so prominent, and shows so much tendency to prevail throughout Christendom, that it calls not for heedless condemnation nor hasty acceptance, but serious consideration of its advantages and faults. It is natural that it should offer peculiar temptations to Americans; for we have no style which is a long inheritance to us, as the Renaissance is to the French, or the Gothic to the English. What little patrimony we had, we have thrown to the winds, as not worth keeping; and we are just now dazzled with the lavish contributions we get from the older nations. Both our desire of novelty and our impatience of discipline encourage eclecticism; and there are more respectable inducements to it than these. The interest of modern times in the study of archæology and of the contemporary art of all nations, the fact that eclecticism suits with the desire for extended culture which is spreading everywhere, make it fashionable. Our exceptional position as Americans, the mixed nationality and sympathies of our people, and our free intercourse with many foreign nations, bring before us elements of design from all quarters, and at the same time increase the difficulty of our selecting any distinct style to which we shall devote ourselves. The fact that modern civilization offers us such abundance of material in the form of drawings, photographs, casts, all sorts of reproductions, seems to lay on us the duty of utilizing them; and the temptation is much greater to take whatever comes, and use all we can get, than to deliberately agree among ourselves what part we shall take, and what part we shall leave.

We have already, in a former article, stated our belief that the use of a distinct style was better, both for architects and for the public, than the mixture of many styles; but perhaps, if a variety of styles is to be drawn upon, the immediate effect will be better, and the chance of ultimate unity no less, where the elements of them all are impartially mixed and spread over all the buildings of our cities, than where different men, or the same men at different times, address themselves rigidly to the carrying out of a single style in a single building, and fill their cities with structures, each aiming at purity in its own style, and all at odds with one another, as in modern Munich. It may be that among the varying tendencies of American architects no distinct style, or even styles, or those which are known as such, can acquire a general adherence, and that, whether eclecticism is desirable or not, the tendency of our people toward it is too strong to be resisted; but, at any rate, it is worth while to consider the dangers and difficulties of it.

A careful look at one of the early Renaissance buildings of France, the Church of St. Eustache in Paris, for instance, is an instructive commentary on its dangers. There may be, and is, great richness, a fine play of fancy, a good sense of effect; and yet in all the details there is some incongruity which shocks not only the feeling of association, but the sense of natural fitness. The base, shaft, and capital, which have been patiently and skilfully adjusted for a column of ten diameters, must be modified in every particular when it is extended to twenty. If they are associated with a pointed arch, they must be modified again, or they will jar; and every new element that is imparted calls for some re-adjustment of the whole. Of this process there is almost no end, for the store from which material may be drawn is practically inexhaustible.

To prepare properly for this sort of work involves no little labor. To be an ignorant or uncultivated eclectic, is a contemptible thing, for it adds pretension to incapability. The man who undertakes the fusing of various styles into one design assumes the responsibility of looking carefully over wide fields for his material, and is condemned if he has not a liberal knowledge of what the world offers him, and if he does not study deliberately and carefully in their own congenital association, so to speak, the elements he elects to use; for, if he does not do this, he will not get the intimate acquaintance which will enable him to feel their proper capabilities and limitations. A minute and thorough acquaintance with the styles he draws from is not too much to require of him; and this need certainly does tend to increase his acquirement, even though it puts obstacles, as we believe it does, in the way of the development of his sense of design.

The temptation, in the face of these difficulties, to crude sketchiness of design, is of course very great; and it is written all over our recent work. There are a great many buildings in our streets, cleverly conceived, which look as if

they had been executed from the rough sketch which the architect had first thrown off to express his conception. The disposition may be good, and yet the details picked up anywhere, ill-assorted, the carving incongruous, the mouldings mean and unstudied. The haste in which we build and design aggravates all this trouble. It seems clear, that if a man has to design a great deal of work, and do it rapidly, he will work most effectively by adhering to one style till he learns to think freely and work fast in it. Eclectic designing is much more exacting, requires more deliberate, laborious adjustment, than design within limits in which the adjustments are already so far made as to establish essential harmony. It requires a stronger mastery and finer skill, to force into union parts that have never been adapted to each other, than to fit together those that have gradually grown into adaptation; and a first conception naturally cannot take form so freely or fittingly in a language that is vague and confused as in one that is compacted and crystallized by long habit.

The temptations of eclecticism to neglect of serious study are as obvious as the tendencies of Americans to desultoriness. A designer who is continually moved to pass from one field to another finds it hard to confine his attention long enough to any one to fairly seize its character, and grasp its capabilities. He has a score or two of books at his hand, and hundreds of prints and photographs: he glances from one to another, but it is seldom that he stops long enough at any one to study it with care. The slight impression which his mind takes from one may be effaced in a few minutes by another; or if in designing one piece of work he is led to get some feeling for the relations, say of shaft and base and capital and load, which will suit a thirteenth-century arcade, in the next thing he does he may find this same feeling obscuring his sense of the fit proportion of column and entablature in some Renaissance design; and, if he mingles the two elements in one piece of work, the separate tones will jangle painfully unless he has a very rare cleverness in attuning them. A morning's walk in New York or Boston will show to any practised eye a dozen examples where the habit of an architect acquired in the treatment of one set of forms has betrayed him in the application of another; and this not only in the mere violation of accepted rules of grammar, but of an essential harmony, the loss of which is obvious to the looker-on, and would be to the designer could he get rid of the prepossessions of the moment. If men could entirely divest themselves of all acquired habits, architects would perhaps be relieved from this embarrassment in designing; but without these habits men could not live together, or at all events work together; and, moreover, the perception of harmony and fitness is itself a habit either of the individual or the race. The influence of association, moreover, is a factor which it is not safe to reject: it is too strong to be brushed aside. The elements of any developed style of architecture have been adjusted only by long and patient labor of many artists. Its associations are the record of this labor: the public has based its education and judgment in architecture on them, and is helpless if they are suddenly stricken away.

It is a necessary conclusion from all these considerations, that the attainment through eclecticism of any form and fixity must be extremely slow. Where the mass of material available for use is as great as that which we have at hand, the labor of adjusting and harmonizing it is appalling, and with the little unity of aim there is among us it must be a long work. Actually eclecticism has not yet been successfully practised by any but the French. They only have shown skill enough to make it at all harmonious, and they have not succeeded in it so well as in the practice of their own defined styles; and it will take some generations of training to ingrain in our people the artistic sense that the French inherit. Meanwhile a serious drawback to the process is its painfulness. It is like learning to play the violin. He who essays an established style, like him who plays a fixed-toned instrument, can by beginning with simple tunes avoid great offence even in his earlier progress; but he who designs eclectically, as he who attemps the violin, must learn not only to play his theme, but to make his notes, and must expect for long years to torture all the sensitive persons who come in his range — and himself if he is one.

Even if the tendency to eclecticism among us is so determined that it is not worth while to argue against it, it is worth while to consider what we are doing. We are attempting, with slender preparation, a more difficult task in architecture than has ever been set before a people. The alternatives are not easy, — either to agree on a style as a starting point, or to attempt to educe harmony out of an enormous mass of unadjusted elements; but we are likely to choose the harder. All this, it is true, implies the assumption, and we think it to be impregnable, that harmony in our way of building is a thing which we must aim at. And it is as well to admit fairly, that as eclectics we are at a disadvantage, that instead of a straight path we take a crooked one; instead of a short one, a long one; for an easy way, a hard one. It might be serviceable to us to acquire the now disreputable virtue of humility, to prepare ourselves for our difficult task by large acquirement and culture, and to look for the full accomplishment of our work only in the far future.

THE ILLUSTRATIONS.

LIBRARY FOR C. H. JOY, ESQ. MESSRS. STURGIS AND BRIGHAM, ARCHITECTS.

This drawing represents a library designed for C. H. Joy, Esq., Marlborough Street. The dimensions of the room are 17.4×19.10 by 11.2 high. The bay is 5.4×14.7, and has a ten-light window to the south, and one of four lights to the east, with a seat at each end. The whole room, walls, and ceiling are of black walnut. The pictures in the frieze are by J. Moyr Smith, architect, of London, the well-known artist of many of Marcus Ward & Co.'s publications.

The bookcases were altered from this sketch by returning them at the ends of the room.

The tiles in the fireplace and hearth were brought from Spain, where they were used as a ceiling between the beams of a refectory in an old convent.

BUILDING FOR THE SAFE DEPOSIT COMPANY OF BALTIMORE. MR. E. F. BALDWIN, ARCHITECT.

A full description of this building is given in the letter of our correspondent from Baltimore.

COUNTRY-HOUSE NEAR BOSTON. MESSRS. PEABODY AND STEARNS, ARCHITECTS.

The house, as will be seen, is of wood, the walls covered with clapboards, and the roof with shingles, painted.

KANAWHA PRESBYTERIAN CHURCH, AT CHARLESTON, WEST VIRGINIA. MR. E. ANDERSON, ARCHITECT.

SANITARY SUGGESTIONS FOR ARCHITECTS.

THE late Dr. Ross, Medical Officer of Health for St. Giles, London, made recently some suggestions concerning the legal regulation of building. These suggestions were discussed in "The Sanitary Record;" and they with the discussion indicate the following points as being of interest and importance: —

Dr. Ross advised that the entire site should be drained, and that the cellar bottom should either be of porous material, or should, if of clay, be taken up and burned and replaced so that it should become permeable. The first of these suggestions is excellent; but the latter, contrary to what would be the general impression, is not in accordance with recent observation on the spread of disease; for the reason that, although the absolute drainage of the cellar bottom is facilitated thereby, the porous character of its material allows the interfiltration of foul gases from the soil of long-used town areas, or from leaky adjoining drains. In houses

sufficiently separated, or which are built on new land, it would be best to take advantage of every means for soil water drainage; but it is believed by learned engineers, that all sites suspected of foulness are best left as firm and impervious as possible. In every case, no matter what the character of the subsoil or of the foundation, the whole cellar should be perfectly covered with the best quality of concrete, not less than six inches thick.

He considers a damp-proof course in the foundation wall above the level of the ground absolutely necessary to prevent the soil moisture from being absorbed into the brick wall of the house, and given off by evaporation into its interior.

Drains passing under houses, intended for the convenience of foul water, should not only be cemented at their joints, but should be entirely covered above and below with a continuous bed of well-made concrete.

His suggestion concerning the minimum size of every inhabited room (1,350 cubic feet) is open to the objection that it might too much increase the rent; but the recommendation that every inhabited room should have a window of not less than sixteen square feet, opening into the outer air, and that it should have a fireplace for ventilation, is one that might certainly be adopted with advantage to the occupant.

The ceiling of the basement room should be four feet above the level of the sidewalk; there should be an area the whole length of the front not less than three feet wide, and at least six inches below the level of the basement floor, and thoroughly well cemented; all water-closets should at least have an outside window which can be easily opened, and should open never into a room, but into a well-ventilated corridor.

No cistern should ever be constructed under the floor of the house. The cistern should always be easy of access for cleansing; and, if made under the cellar bottom, its main hole should be covered with a well-cemented slab, — the necessary air-vent coming through a pipe from the open air.

THE BACK DRAINAGE OF TOWN HOUSES.

About twenty-five years ago the drainage authorities of London strongly recommended the adoption of a system known as "back drainage;" that is, the running of branch mains, not through the streets, but through back courts and alleys communicating with street mains at the ends of the blocks.

The advantages of this arrangement were obvious both on the score of economy, and in view of their avoiding the running of drains under the whole length of the house. All drains, soil-pipes, &c., were to deliver directly to the rear; where from the location of kitchen, laundry, butler's pantry, bath-room, &c., the largest amount of waste water is produced. The tabulated instruction and the diagrams accompanying this suggestion were very convincing.

In practice, it has been found that this system of back drainage has often serious obstacles to contend with; and, while it is in our own towns often to be recommended, its adoption should always be limited by the consideration that it is necessary for the sewer authorities of the town to have entire control of these drains, — usually laid through private property, — with the right of unrestricted access at all times. Without such powers it would be impossible for the necessary inspection and repairs to be made; and the carelessness of one resident of a block of buildings might create the gravest annoyance to all of the others during the time that it would take, by ordinary legal processes, to obtain the right of entrance for repair.

Beyond these suggestions it is not possible here to go. The decision of the manner in which house-drainage shall be disposed of, whether directly into drains lying behind the house, or whether under them into street sewers, must rest in every case upon the conditions which obtain.

COMMON DRAINS.

It is not unusual, especially where a row of houses is built by a single owner (although it may be the intention to sell these houses to different individuals), for two or more of them to discharge their wastes through a common drain. If there is an alley-way between each two houses, it may then be allowable to discharge the wastes of both into a pipe running under this open space; but under no other conditions should the drainage of any one house depend upon the condition of the outlet-pipe of another. Each should have its own means of discharge quite to the public sewer, so that each occupant may be held responsible for a neglect of the regulations by which private drains ought always to be controlled, and so that he alone need suffer from the consequences of his neglect or abuse.

MR. HASWELL'S SUGGESTIONS.

The well-known engineer Mr. Charles H. Haswell recently communicated to "The New York Herald" an article on the public sewers, and suggested a plan of street tunnels similar to those in use in Paris, large enough to furnish a water-way for sewage, and to accommodate water-supply pipes, gas-pipes, and telegraph wires; and to afford easy access for the repair of all pipes communicating with private houses. He would discharge all sewage into scows to be towed away for use in agriculture, or to be emptied into the open sea.

As a whole, this plan is open to obvious objections, at least on the score of present expediency; but, in presenting it, some suggestions are made which are well worthy of notice.

He calls attention to the fact that soil-pipes, in spite of their weight, are in ordinary building often supported by wood which may decay and settle, or by some other form of insecure foundation; and that, when once this support is lost, there is danger that the weight of the pipe will draw it loose from its connections above, and open some joint through which sewer-gas may escape into the house. Rain-water pipes often discharge into soil-pipes, so that when they are running full in a heavy shower they may suck out the sealing water from every siphon trap in their course. If this occurs in a night shower, these traps are likely to remain open until they are used on the following day. If it occurs while the house is uninhabited, as during summer, they may remain open for months. The well-known fact is also referred to, that taps in city houses are very generally emptied by evaporation during the summer, and that the family returns from its vacation in the country to a house that is filled with emanations coming direct from a foul sewer in the street. He calls attention to the fact that a piece of string or rag that has passed into a trap, and has one end hanging over into the soil-pipe, has frequently the effect of drawing out its sealing water. To obviate these difficulties, he makes the suggestion that a very small jet from the water-main discharge constantly into every trap, — the size of a knitting needle would be sufficient. Such a jet must come from a water-closet supply cistern; for, if from the water-main, the falling away of the water in this, as when a faucet in the kitchen is opened, would suck in through all such apertures the poisonous gases existing in the soil-pipe.

In New York it is sometimes the case, that the lower course of brick of a sewer is left uncemented in order that the sewer may act as a drain for the soil. This is sometimes effective; but sometimes, on the other hand, the soil acts as a drain for the sewer, allowing its foul contents to escape in a way to do great harm. The better way would be to construct an independent tile drain directly underneath the sewer, or to use the tubular fire-clay invent that has recently been introduced.

Referring to the condition of affairs in New York, Mr. Haswell says among other things, "That the entire practice — for system there is none — of the drainage and sewerage of this city and the draining of its suburbs is at variance with propriety, opposed to the advancement of the city and the interest of its inhabitants, at variance with the science of engineering, calculated to drive dwellers in our suburbs to seek more sanitary locations, effective in deterring others from returning to the once desirable residences in the suburbs of the city, productive of disease, and involving a heavy expense to remedy the neglect.

"That unless a proper system of drainage, sewerage, and ventilation is forthwith commenced and consummated, the insanitary condition of our city in every portion of it will involve a depreciation in value, far in excess of the cost of the system proposed, independent of the annual decimation of the population by disease and removal."

He calls attention to the fact (which he understates), that, with the best location that a city could have, New York has a death-rate twenty per cent higher than London and Paris, which are inland towns with greatly inferior natural advantages.

CORRESPONDENCE.

CHICAGO, December, 1875.

THE publication of the report of the first commission appointed by the Secretary of the Treasury to examine our uncompleted Custom House, and the Secretary's instructions to have nothing done until Congress could meet, and the Secretary could ascertain if he had authority to expend the appropriations of the building

ON
ANNE
MAIN
RARE
BINDE

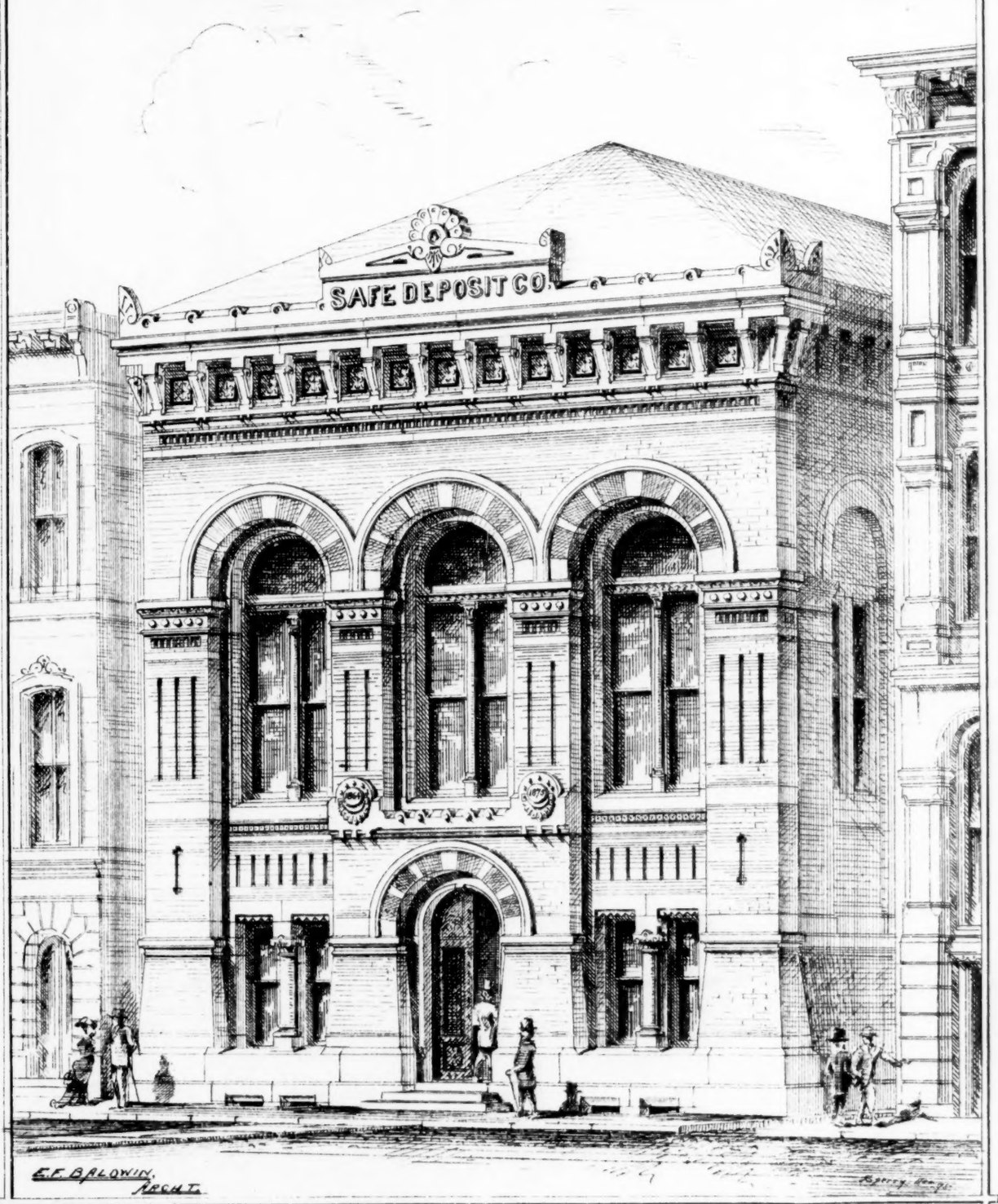
DESIGN IN PERSPECTIVE FOR LIBRARY FOR C. D. JOY, ESQ.

MESSRS. SLURGIS AND BRIGHAM, ARCHITECTS, BOSTON.

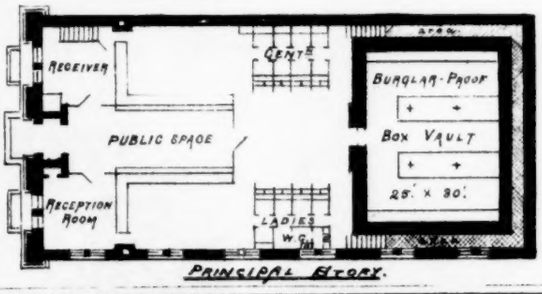
House near Boston Mass. — Peabody & Stearns Archts

James R. Osgood & Co. Boston.

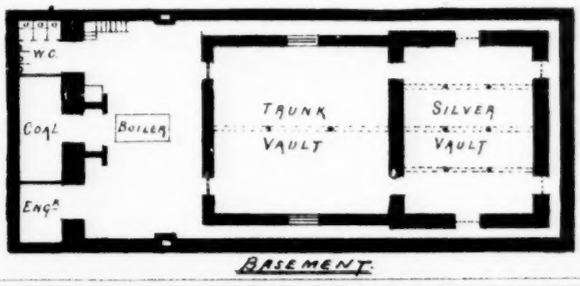
BUILDING FOR THE SAFE DEPOSIT CO. BALTO.



E. F. BALDWIN, ARCH.T.



PRINCIPAL STORY.



BASEMENT.

HELIOTYPE

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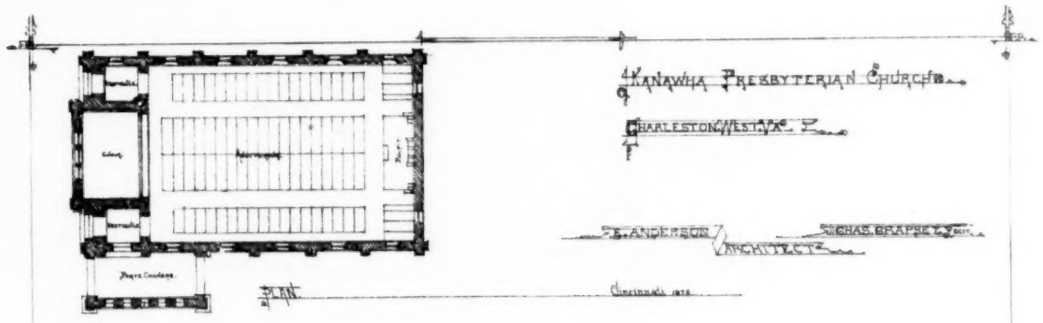

HELIOTYPE JAMES R. OSGOOD & CO. BOSTON

in tearing it down, caused great uneasiness and anxiety among the citizens of Chicago. Pending the examination by the first commission, the local press, which had succeeded in making a sensation by declaring the building to be a total failure, changed its tone, and accused the supervising architect of attempting to destroy the building for the sake of getting an opportunity to erect a new one designed by himself; so that, when the report appeared, the press were unanimous in condemnation of it, and demanded that a committee of local architects be appointed to make a further examination. Our Congressional representatives went to Washington to intercede with the Treasury department; the papers were filled with correspondence consisting of *ex-cathedra* opinions, letters of the former superintendent in his own defence and of the contractors in their defence; and the subject became the town talk during the hot days of last summer.

While this was going on, the Common Council, determined to have its finger in the pie, and in obedience to the suggestions of the daily papers, passed a resolution authorizing the mayor to appoint seven architects to examine the building, provided the Government should be willing. The mayor appointed as such committee, John M. Van Osdel, Edward Burling, William W. Boyington, O. L. Wheelock, Augustus Bauer, and J. T. Egan, architects, and E. S. Chesbrough, city engineer. The requisite permission having been given, and all the facilities accorded by the Secretary of the Treasury and the supervising architect, the committee went to work.

Without attempting to describe in detail what this committee did, I will give as briefly as possible the main points in their report, with this preface, however: that the committee, instead of boring for an examination of the subsoil, resorted to the expensive expedient of sinking two shafts at the places designated by the previous commission as the softest ground, and consumed more than two weeks in the entire examination.

After some preliminary remarks describing their course of procedure, they say with regard to the levels around the first story water-table, which measures more than one thousand feet in length, "The north, south, and east fronts, including the four corners of the building, were found to be practically level; from the highest to the lowest point being less than half an inch, and the four corners varying not more than one-eighth of an inch." The report of the first commission gave the greatest variation at the corners at exactly half an inch, and the maximum difference of level between any two points as $1\frac{65}{100}$ inch. The first levels were taken on June 9, and the second in August.

With reference to the examination of the ground, the Chicago Commission say: "Two test-pits were excavated, one of them thirty feet west of the south-west corner of the building. A firm stratum of clay was found on a level with the base of the concrete foundation. This stratum was three feet six inches thick. Underlying this is a stratum of soft blue clay ten feet deep, then a firmer clay the depth of which was not ascertained. The test-pit at the north-west corner of the building reached the firm clay at the same depth as at the south-west corner. This firm stratum was found to be nine feet deep at this point, then the soft clay stratum five feet deep, then the firmer clay the depth of which was not ascertained. The soft clay stratum was uniform in density, and its consistency similar to modellers' clay. This stratum is denominated mud in a former report by the United States Commission, as tested by borings with a sharp pointed one and one-half inch auger, which could be forced through the stratum with slight pressure (and is so reported to the present commission by the same borer). The commission caused test borings to be made in front of the Pacific Hotel and Lakeside Building. These two heavy buildings face the West front of the Custom House about a hundred and twenty feet distant. The soft clay stratum was found at the south corner of the Pacific; but the north corner of the building appeared to have no soft stratum under it. The weight of the building was ascertained to be two tons to the square foot of its foundation. The soft clay was found in front of the Lakeside Building, also underlying the Honoré Block, facing the north front of the Custom House. None of these heavy buildings show any signs of unequal settlement or of any uneasiness on the foundations."

The report then takes up the computation of relative weight and bearing of foundation, a subject on which there has been considerable discrepancy between the reports of the several commissions. The supporting capacity of the ground was tested by several experiments; and similar experiments, though with different apparatus, were made by each of the other commissions.

The committee also examined the substrata by drilling through the concrete floor in twenty different places, and, by pressing a half-inch pointed steel rod down into the strata, find it variable; but, from the fact that the present weight of the building shows no unequal settlement on this variable surface, it is presumed by the committee that the additional weight required may be carried safely.

The large crack in one of the interior walls was, in their opinion, caused by allowing the frost to pass under the wall, which caused its upheaval and consequent fracture. The crack was open at one time an inch and a half. When the frost retired, the crack closed as tightly as possible. The closing of the fracture, they say, is proof that it was not caused by any settlement of the adjacent parts of the building, and is confirmed by the fact that the water-table remains as truly level as when first placed in position. They say, "There are also slight indications of movement, such as gaping and crimping of the joints of the water-table of the west front (where the superstructure is wanting), which is clearly attributable to the action of the frost, as the joints have closed on the subsidence of the frost. The crack in the concrete, running parallel to the west wall, is attributable to the same cause. No transverse fractures of the concrete forming the foundations were found." Reference is here made to the concrete which was filled in between the foundations, and covering all the interstices, which was thinner than that used under the walls, and subject to the action of any frost which might strike through it. It has always been difficult in this city, to discriminate between the action of frost and settlement, the results being apparently the same in both cases; in the one case there being an actual elevation of the lighter parts, and in the other a depression of the heavier parts. A comparison of levels with bench marks, is the only correct test until the return of warm weather.

With regard to the stone used, the committee report as follows:

"The commission is of the opinion, that the large stones forming the ceilings of the porticos, and a few others in different parts of the building, are inexcusably patched. They should be removed, and proper stones put in their places. As to the quality of stone being used in this building, the committee can only judge from what was seen in the premises, and from such buildings as have been constructed from the same materials in this city. [It appears that many of the stones in the base course of the superstructure, and in several of the basement piers, throw off a thin scale; and this does not appear to be confined to what is supposed to be an inferior quality of stone, but takes place in stones supposed to be of the best quality.] Upon careful examination it was found that stones that have an opportunity to season, or become perfectly dry, exhibit no signs of disintegration. . . . The lamination of the stones in the building occurs principally in the centre of the large blocks. The external angles of the same, having become dry, have in no case deteriorated. The lamination appears in some cases in the internal angles of the stone work, where the stone has less opportunity to dry or become seasoned. Comparatively few stones placed in the work are of inferior quality. They can be removed, and proper stones put in their place, without difficulty. It is believed by your committee that, after the stones have become seasoned, no further lamination will take place other than what is common to all sandstones."

The general opinion of the committee is, that the concrete and workmanship of the building, including the cut stone, are unexceptionable.

Their summing-up is as follows:—

"1. That there is no evidence of weakness or instability in the present structure.

"2. That the foundations are sufficient, with the precautions suggested in this report, to carry the load contemplated by the design.

"3. That the Buena Vista stone, carefully selected, will be as durable as any sandstone that can be obtained.

"The Commission is of the opinion that work on the building could be resumed (with the precautions suggested), and carried on to completion."

In view of further pressure brought upon the Secretary of the Treasury by interested parties and members of Congress, to allow the work to go on, he concluded to appoint a new Commission, and to ask the President of the United States to nominate half of the number. The main object in appointing this new commission was, as expressed in the written instructions, to review the two previous reports, which gave conflicting opinions. The instructions were lengthy and exhaustive, covering inquiry upon all the points of difference between the commissions, and others of no less importance. The intention of the secretary is fully set forth in the following paragraph:—

"Recognizing the need of an early completion of this very important public work, not only to the Government of the United States, but to the prosperity and business interests of the city of Chicago, and at the same time recognizing the responsibility resting on this department, and the paramount duty to prevent the sacrifice of a large sum of public money upon a work which may not possibly be safely completed, it has been determined to confide to you the review of these conflicting reports as a basis of action for this department, or for information to Congress."

An additional subject of inquiry was to be, "Whether any changes in the plans or materials to be used in the construction of the building should be made; and, if so, what?"

The following gentlemen constituted the commission: Gen. James H. Wilson of New York, and Gen. W. B. Franklin of Hartford, Conn., civil engineers; John McArthur, jun., of Philadelphia, Henry Whitestone of Louisville, and Nathaniel K. Bradlee of Boston, architects; and Andrew Kennedy of St. Louis, and R. K. Dobbins of Philadelphia, builders.

The committee was appointed on the 24th of August, and went to work on the 3d of September, at Chicago, being assisted by Mr. Samuel Hannaford, temporary superintendent of the building. Their report was made on the 25th of September, and was immediately published. Appended to the report is the indorsement of Secretary Bristow, ordering the immediate resumption of the work. I send you copies of both, as it is impossible to condense them. The report is the shortest and by far the most important of the three, as it is the only one on which decisive action has been taken.

Work was actively resumed on the 1st of November.

Comparatively little progress has been made thus far on account of the lateness of the season, for frequently no work can be done for days together.

The stone-work of the second story of the Dearborn and Jackson street fronts is nearly set, while work is being done on the first story piers of the Clark-street front. The piers which were out of plumb have been taken down and rebuilt. With all these efforts, it is hardly probable that the second story will be completed during the winter; and if the winter should suddenly become very severe while work is being actively prosecuted, and so continue for any length of time, the same damage by frost which occurred last year may be repeated unless extraordinary efforts are made to protect the foundations.

I have endeavored to give the main facts about this unfortunate structure as briefly as possible, and without comment, hoping that they may be of interest to members of the profession at a distance, and may serve to answer the many inquiries directed hither.

BALTIMORE, Dec. 31, 1875.

THE recent meeting of the American Institute of Architects in Baltimore, the publishing of their daily proceedings, and the pleasant social intercourse with the members present from other cities, has given rise to an amount of interest in the profession, not only among the architects, but also among the public at large, much greater than had hitherto existed, and evinced most clearly to all the important position, practically and artistically, which the profession has attained in America; entirely distinct from the mere mechanical trade of the builder, carpenter, or mason.

Of the class of buildings erected from fifty to seventy-five years ago, Baltimore contains many specimens, especially among private residences, equal in elegance of design, comfort, and solidity, to any erected in this country in the then prevailing style. The later work, of the last twenty years, has not been so successful, the most important buildings possessing but little merit beyond a greater or less amount of expensive and showy ornamentation.

During the last two or three years, however, there have been signs of better taste, and a desire for greater simplicity and truth in the use of materials, and notably of the Baltimore brick, unsurpassed in quality by any other; and the most important building yet constructed in that material is that for the Safe Deposit Company. A limited competition of three was invited by the building committee, and two hundred and fifty dollars paid to each of the unsuccessful competitors; the usual five per cent for the selected design, which was that of Mr. E. F. Baldwin of Baltimore.

The problem for the architect was to erect, on a lot one hundred and one feet deep, a fireproof building, isolated on three sides by narrow alley-ways, and having a frontage of forty-seven feet on one of the principal thoroughfares of the business part of the city. The building was to be about fifty feet high, and the interior to consist of a single room open from floor to ceiling, and surrounding the fire and burglar proof vault, which would occupy rather less than one-half of the plan, the remaining space on the floor being filled by the various counters and desks. The front and plans of Mr. Baldwin's design are shown in the drawing. The building is in Baltimore pressed brick, with Cheat-river stone cornice and door and window facings. The two small window columns, and the filling of the door arch, are of polished Quincy granite. The base is of granite. Tiles are used in the cornice, and below the main windows; and the whole is laid in black mortar, giving a fine tone to the deep red of the brick, which accords well with the peculiar bluish shade of the stone. The original design contained a moderate amount of well-disposed black brick. This gave a fine general effect of color to the whole front, which is now somewhat lacking, as the building committee insisted that these should be omitted. The roof is of the ordinary iron truss, filled in between the rafters with the Teil hollow blocks, and covered with slate laid in cement.

Iron bars project from just below the cornice of the building, across the intervening space of about eight feet to the wall of the higher building on the south side, to prevent its falling outward in case of fire, and crushing the roof. The brick construction throughout the entire edifice is laid and grouted in cement.

The excavations for the foundation walls of the safe were continued below tide-water, the basement floor being but a few inches above that level. These walls, laid in concrete footings six feet deep, are of hard burnt brick three feet six inches thick, laid and grouted with cement, and upon them are placed heavy iron girders arched with brick; and upon this sub-structure rests the safe itself, both the safe and the vault beneath being isolated from the walls of the building by a passage-way of three feet. This vault is to be used for storing large boxes, &c. Its entrance is protected by iron gratings, and also iron fireproof doors, to be closed in case of fire only. There are a succession of loop-holes on the line of the eye of one who passes round the exterior passage-way, entirely through the walls of the vault, thus keeping the interior and the bottom of the safe constantly in view. Two hundred thousand hard burnt brick, and seven hundred barrels of cement, were used in building the walls of this vault. The floor of the safe proper is on a level with the floor of the building; and the safe is thirty-six feet wide, thirty-one deep, and fifteen high, constructed as follows: —

There is an inner shell three inches thick, formed of six layers of alternate welded steel and iron, half inch each, held together with Hall's patent conical welded steel and iron bolts, threaded and twisted, which, when in position, can be neither forced in, drawn out, revolved, nor drilled. The plates at the corners are bent and not mitred.

Outside of this three-inch wall will be twelve inches of Hall's patent concrete fireproof filling, held in place by an outside iron case; and outside of all this will be twenty-one inches of brick laid and grouted in cement, thus making the entire wall of the safe three feet thick; twenty-one inches of brick, twelve inches of fireproof filling, and three inches of drill-proof steel and iron. The front of the safe, facing the door of the building, will be finished in ornamental iron work, which will be continued up to a height of twenty-eight feet from the floor of the building, forming a sort of screen or front to the directors' room, which will be directly over the safe, thirty-one by thirty-six feet, and reached by an iron staircase.

There will be but one entrance to the safe, protected by three distinct sets of doors; the outer doors to be of eight inches of fireproof and three inches of steel and iron, the next set to be of five inches of steel and iron, and the inmost set to be of four inches of steel and iron; each set of doors to be furnished with forty round two-inch bolts, and four of Hall's combination bank locks. The locks are all duplicated, and so arranged that, should one be out of order, another will unlock the doors. There will be in the safe three hundred tons of steel and iron, and about a thousand pounds of fireproof; and its capacity will be about eight thousand ordinary safe deposit boxes. The entire work of the safe, including locks and boxes, is done by the Hall Safe and Lock Company of Cincinnati.

The interior walls of the building will be wainscoted in marble to a height of about five feet; and above this will run a light iron balcony entirely round the building, for the purposes of observation. The rest of the walls and ceiling will be finished in plaster and fresco.

A new stone-dressing machine invented by Mr. Brunton, the designer of the Channel tunnel-drill, has been tested in England lately, and is said to work rapidly and effectively.

THE METRIC SYSTEM.

BY J. P. PUTNAM.

AT the November meeting of the Boston Society of Civil Engineers, the subject of the introduction of the metric system was discussed. It was resolved, "That it is very desirable that the metric system of weights and measures should be generally adopted, and the irregular standards now in common use abandoned." A standing committee on this subject was appointed, and instructed to prepare a form of memorial suitable to be presented to Congress, praying that a date be fixed after which the metric units shall be the only legal standards. The committee was also directed to communicate with other organizations, with a view to securing united action in petitioning Congress to interview the State Board of Education, the United States Commission for testing iron and steel, &c.

A circular on the subject has been prepared by the committee, and sent to the civil engineers, and others likely to be interested therein, throughout the country. We quote from the circular the following: —

The real difficulty, we believe, is not with the proposed system, but with making the change. The cost of such a revolution, affecting so large a proportion of the transactions of life, will obviously be enormous; but it is equally true, if not quite so obvious, that it is costing us enormously to keep up the present confusion. The army of custom-house clerks, employed in making transfers from one kind of weight or measure to another, bears witness to one item of expense. Nearly every individual in his daily business has to undertake brain labor in dealing with our present irregular weights and measures which could be saved by the use of a simpler system. It would be difficult to estimate in money the value of this work; but for our whole population it would amount, in a long series of years, to an immense sum; to say nothing of the vexation, and the probability of being cheated.

With a powerful public sentiment in favor of the reform, it will still be desirable that some controlling voice should give the signal for a simultaneous movement toward the actual abandonment of the present measures, and substitution of the new ones. That may evidently be done by Congress setting a time when the change must be made; and our business men are apt to say that this is the only way in which the change can be made. We suppose that eventually the metric system will be established as the law of the land, but that people will not make effective preparations for adopting it until Congress shall appoint some day in the future for such legislation to take effect. Congress may be expected so to fix a date, if it can be convinced that public opinion will abundantly support it. To this end, it is hoped that influential bodies throughout the United States, who are ready to welcome the change, will not fail to make their feeling known. We suggest that the appropriate form in which to express it is an appeal to Congress for compulsory legislation; for this seems to furnish the key to the whole situation. Let the main attack be concentrated upon this point, though a rattling fire of efforts elsewhere may be of great service.

When people know exactly how much time they have before them, every one will readily decide, with reference to his own transactions, upon the successive steps by which the new measures can be gradually introduced and familiarized, and the present ones abandoned. Memorials have been presented to Congress by the American Metrological Society, pointing out what changes towards the metric system appear to be next in order in the management of the government business.

That the numerous and very great obstacles in the way of this reform can be surmounted by conducting it in a deliberate and judicious way, is proved by the history of the recent adoption of the metric system in Germany. It is a most encouraging fact, that a country so densely inhabited, standing so high in the scale of civilization, and having all the arts, manufactures, and commerce so fully developed, should have been able, in the space of four years, to effect the adoption, in nearly all the affairs of life, of a new system of weights and measures. The movement was begun there by societies of civil engineers, architects, railroad superintendents, foresters, and agriculturalists, naturalists, chemists, and others, who passed votes and sent petitions to the German Congress to have some uniform and sensible system of weights and measures made the only legal standard in Germany. After some years, this induced the appointment of an expert commission, which reported in favor of the metric system, and recommended immediate legislation. Accordingly, in 1868, the German Government passed a law which made the new measures the only legal standard from and after Jan. 1, 1872. The expert commission was kept in existence, and made to superintend the innumerable details of the change. During the intervening time, the greatest activity prevailed throughout Germany in making preparations, so that on Jan. 1, 1872, there was but little left to do. The principal changes had already been gradually effected; and what was left to be done was of slight relative importance, and was accomplished with very little disturbance to business. Let us profit by this example.

At the last meeting of the Society of Arts at the Massachusetts Institute of Technology, on the motion of Mr. Edmund H. Hewins, engineer and iron bridge builder, it was voted that a committee of three be appointed to co-operate with other societies for the purpose of facilitating the introduction of the metric system of weights and measures, and to prepare a suitable memorial to Congress.

It is to be regretted, that no such action was taken by the American Institute of Architects at its last annual convention. Petitions to Congress, coming in from all parts of the country simultaneously, would act as a powerful lever towards inducing that body to take such immediate steps as would facilitate the introduction of the system.

To urge that Congress would be unlikely to take any notice of such memorial coming from the American Institute of Architects, seems scarcely an argument against sending it. It is certain that Congress will take no notice of it if it is *not* sent. No action will be taken by Congress until the people signify in some such manner their readiness to receive the new system.

Of course we cannot expect those least interested in the reform to take the first steps towards bringing it about, any more than we can expect to see the cart draw the horse.

That there are machinists and manufacturers however, who are already alive to the importance of this matter, is shown by the communication written by an engineer and machinist, and sent to the American Metrological Society, wherein the advantages especially to mechanics, of having a common standard for screws, taps, dies, &c., in measures of the metric system, published by an expert commission under the sanction of Government, are shown, and compared with the confusion which now exists in this matter. He shows that, were the metric system introduced, some universal standards of form and measurement would take the place of the various arbitrary measures which now cause so much confusion among manufacturers. Whereas bricks, for example, are now manufactured of all possible dimensions, the introduction of the new system would be likely to establish a uniform size, as it did when the metric measures were introduced in Germany.

The dimensions adopted by Germany for bricks are 6½ c. m. (centimetres) × 12 c. m. × 25 c. m.

If the people signify that they are anxious to keep pace with other nations in the march of civilization, they may safely leave to Congress and to expert commissions appointed for the purpose, the work of determining by what means the reform can most easily be accomplished.

Germany has done it, and her example is offered to us. Her action is rendered serviceable to us by the numerous published laws (see, among others, "Kletke, Maass- und Gewichts-Ordnung," Berlin, 1871) on the subject passed at the time, and calculated to meet every difficulty which could possibly arise in making the change. Let us, then, rather consult these publications when questions of any particular difficulties arise, and find therein satisfactory solutions, than waste our time raising imaginary objections to the introduction of what every thinking man acknowledges must come sooner or later.

NOTES AND CLIPPINGS.

THE regular monthly meeting of the Boston Society of Architects was held on the evening of Jan. 7, at the architectural rooms of the Institute of Technology; the President, Mr. Cabot, in the chair. The Secretary's report having been read and accepted, Mr. Van Brunt, from the committee on providing business and entertainment for the meetings, made a further report in addition to that presented at the last meeting, concerning the scheme for the remainder of the season. Every architect feels occasionally the advantage which he might derive from a thorough and frank criticism and analysis of his own work by his professional brethren, — an advantage seldom to be had. Following this thought, the committee now propose, as a part of the regular business of each of the remaining meetings of the present season, the analysis of some interesting or important work in our own neighborhood. The committee will announce at each meeting the building to be taken up at the next, with the names of two members who are to introduce the subject. In pursuance of this plan, it was announced that the subject for the February meeting would be the new building of the Old South Church; the discussion to be opened by Mr. Cabot and Mr. Richards.

For the proposed lectures at the Institute of Technology, the committee have prepared the outline of a series on the Renais-

sance and its development in the various countries of Europe, somewhat as follows: —

Italian. — 1st period, Arnolfo to Palladio.
2d " The later Renaissance.
French. — 1st period, Francis I. to Louis XIII.
2d " Louis XIV. and his successors.
English. — 1st period, Elizabethan.
2d " Jones, Wren, and their successors.

Some discussion followed as to the advisability of making the course include also the Renaissance in Spain and Germany, and also as to the method by which the subjects should be allotted to the lecturers; but both of these matters were finally left to the discretion of the committee, who were given full power to make such arrangements as they may think best.

The President read sundry papers relating to the centennial exhibition and the contribution of drawings from the Boston Society. Some discussion followed, after which it was voted on motion of Mr. Thayer, that the President, as chairman of the committee having this matter in charge, be desired to write to individual architects in Philadelphia, to ask for such information as they may be able to give, to guide us in our further action.

Mr. Ware then by request read the report of the Committee on Professional Practice, presented at the recent convention of the Institute at Baltimore. The report was devoted to a consideration of the advantages and disadvantages of competitions, and of the best way of conducting them so as to avoid as far as may be the latter while securing as many as possible of the former.

The freehand sketches contributed to the meetings of the last season were then distributed by lot among the contributors, after which the meeting adjourned.

CHARLES A. CUMMINGS, *Secretary.*

A FRENCH engineer, M. Bazin, has invented a very ingenious dredging-machine, which is said to work with extraordinary efficiency. Its motive is the principle of hydrostatic equilibrium; and its working can be best explained by an example. Let us suppose that at the bottom of ten feet of water there is a bed of liquid mud, whose specific gravity is 1.25. Opposing columns of the two fluids will be in equilibrium when their height is in the inverse ratio of their densities; that is, the pressure of the ten feet of water will balance a column of eight feet of the mud. Then, if a tube is thrust down to the bottom, the mud will rise in it to within two feet of the surface of the water, provided that above that level it is kept free. Or if, from the bottom of a vessel, at a level of a little more than two feet below the surface, a tube is dropped so that its lower end reaches the mud, and its mouth is kept constantly clear, the pressure of the water above will force the mud up into the vessel; and the only labor required will be to remove the mud as fast as it issues from the mouth of the tube; and to raise it to the surface it will have to be lifted by applied force, not from the bottom of the water, but only from the bottom of the vessel. This distance, in the case we have supposed, will be only one-fifth of the depth of the water, and will therefore consume only one-fifth the force required in the ordinary processes. M. Bazin's apparatus is a boat, with a straight tube suspended from its bottom near the stern. The tube is jointed at the top, so that its greater or less inclination may suit the varying depth of the water, and its end always reach the mud at the bottom. The well at the mouth of the tube must evidently be separated from the receptacle in which the mud is collected, so that it may be kept clear. At the bow of the boat is suspended a frame, or carriage, the outer end of which also reaches the bottom of the water, and carries a revolving shaft armed with spikes or claws. The shaft is turned by an endless chain passing over a drum, and acts like the upright shaft of a pegging-mill, its claws tearing up the bottom, and reducing it to a pulp, or mud soft enough to be forced freely up the tube, which, with the motion of the boat, follows the advance of the shaft. It does not appear, from the description we have seen, whether the traction of the revolving claws against the bottom is utilized in pulling the boat forward; but then we see no reason why it should not be. At a trial at Suez, while the common dredging-machines only raised from two to three-fifths of a cubic metre of mud per horse-power per hour, M. Bazin's apparatus raised two and three-quarters cubic metres. The evident condition of efficiency is, that the immersion of the bottom of the vessel, or the top of the tube, shall be a little more than the difference in height of the equilibrating columns of water and mud due to their difference in density; and that, the greater the depth of the water, the greater shall be the immersion of the boat; or else the greater the fluidity, that is, the less the density, to which the pulp must be reduced.

A LARGE circus has been built in Paris, decorated and lighted by English contractors, with the help of English workmen alone. It occupies the court-yard and façade of the immense block of buildings known as the *Magasins Rèunis*, in the Place du Château d'Eau. The architect, M. Gridaine of Paris, has designed it to entertain seats for four thousand besides considerable standing-room in the promenades. To this he will add a large balcony facing the orchestra, and some private boxes, a saloon about two hundred and fifty feet long handsomely furnished, and an American bar. The stables are under the rising seats of the circus, and will hold eighty horses, besides elephants, camels, and lions, and has a tunnel large enough to allow a carriage to drive from under the seats without being seen by the audience. Dressing rooms, property rooms, and so on, are provided in the basement. The circus is built entirely of iron and masonry, and completely isolated from the rest of the building by an iron enclosure. The roof is of iron, glazed; and beneath it is a fine network of galvanized iron wire to prevent accidents from the fall of broken glass. The cost is eight hundred thousand francs.

THE new Christ Church in Westminster, London, is especially interesting on account of the tower, built by subscription as a memorial to Abraham Lincoln. The building is already covered in; and the Lincoln Tower, the tower and spire over the central octagon, and that above the lecture hall, are almost finished. The vane has been hung in the Lincoln Tower; and the scaffolding is taken down, showing it to be the highest tower in London, except those of the Houses of Parliament and Westminster Abbey. Up to a few feet below its turrets it is built of Kentish rag-stone; above this the whole is of Portland stone. The spire is octagonal, and has bands of red Dumfries stone carried round it at three different levels, between which stars are carved on the Portland stone, the whole being meant to symbolize the stars and stripes of the American Union. A belt of similar stars is cut on the upper part of the tower.

A NEW cement, called Keene's Cement, has been lately imported from England, and introduced here. It is used for interiors, and is said to be harder than any known cement, and to be impervious to noxious gases. There are two kinds, or grades. The superfine quality is white, resembling statuary marble when properly worked. Colored, it is said to make a good *scagliola*, and to take a high polish. The coarser quality may be used for stucco, and can be run in mouldings, where strength and durability are required. It has been used in Boston in the buildings of the New England Mutual Life-Insurance Company, the New York Equitable Life-Insurance Company, and the Fine Art Museum.

AT a recent meeting of the Society of Telegraph Engineers, Mr. Charles Fleetwood, of the Postal Telegraph Department, read a paper on "Underground Telegraphs; the London Street Work." The author stated, that the system was first inaugurated in 1837, with a line of five wires, conducted in lead pipes, between Paddington and Drayton. This line became defective, and was replaced in 1841 by posts and overhead wires. In 1846, on the incorporation of the Electric Telegraph Company, a new line was laid; and in 1848 the total system of the company comprised fifteen hundred miles of telegraph-wire. All the cables are sent out from the Postal Stores in lengths of four hundred yards. These are divided into two, and are passed over and under wooden rollers fixed in the flush-boxes, the second roller being so arranged that the cable enters the pipe with a clear lead, and without being chafed against its edges. Mr. Fleetwood stated, that, within the past five years, nearly the whole of the underground system in London has been re-laid with little or no interruption of the working circuits, and much less than is experienced from renewals on railways or road lines.

A LIGHT-HOUSE of Dalbeattie granite has been constructed under the Trinity Board in England, which is to be shipped to Ceylon, and there set up. It is circular in plan, about a hundred feet high, and thirty broad at the base; is built in sixty-four courses, of which the lower fourteen are solid, and serve as a platform. Above these are seven stories vaulted and floored with stone.